amended term specifies the function of the means and meets the requirements under 35 USC § 112.

No new matter is introduced into the claims by these amendments.

Claims 33-51 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Warzecha et al. (DE1668347) in view of Takahashi et al. (JP1-149801). Applicants respectfully traverse this rejection.

In the process of the present invention a polysaccharide is treated according to steps (i) – (iv) of claims 33 and 50 to provide a neutralized liquid comprising a salt of the acidic compound and the basic compound. The produced polysaccharide is removed in step (iv) of claims 33 and 50. The neutralized liquid is subjected to a first separation step (a) at an alkaline pH to separate the salt for the organic solvent and the residue of the polysaccaride and to provide a purified, neutralized liquid. The purified, neutralized liquid is subjected in step (b) to an electric current and a separation means to promote the conversion of the salt to the acid compound and the basic compound.

The Examiner has indicated that "one skilled in the art would have a reasonable expectation for success in combining both references to accomplish the conversion of a polysaccharide ether salt to the acidic compound and the basis compound." Applicants do not wish to present arguments on this point at this stage of the proceeding, but submit that the conversion of a polysaccharide ether salt is not what is claimed in claims 33 and 50. The present invention relates to the treatment of a neutralized liquid after separation of the polysaccaride ether in step (iv) of claims 33 and 50 (emphasis added). The liquid comprises a salt, for example sodium nitrate or sodium acetate (see page 7, paragraph 2 from the bottom). Contrary to the teaching of Takahashi et al., in the present invention the liquid left after separation of the main polysaccharide product, not the main polysaccharide product, is subjected to the above-mentioned steps (a) and (b).

For the reasons explained below, the teachings of Warzecha et al. and Takahashi et al. cannot be combined.

Warzecha et al. teach a process for purifying crude hydroxyethyl cellulose, which is a non-ionic material. Takahashi et al. teach the conversion of a cellulose ether sodium salt, such as a sodium salt of carboxymethyl cellulose or sulfoethyl cellulose, into an acid-type cellulose by electrodialysis. The cellulose ether sodium salt is an ionic material. Because Warzecha et al. teach the purification of a non-ionic cellulose ether and Takahashi et al. teach the treatment of a cellulose ether salt, the skilled artisan would not be motivated to combine the teachings of the two prior art references. The skilled artisan would not apply the electrodialysis taught by Takahashi et al. in the process taught by Warzecha et al. because the skilled artisan knows that electrodialysis of an non-ionic material technically does not make sense.

Even if, for the sake of argumentation, the teachings of Warzecha et al. and of Takahashi et al. could be combined as suggested by the Examiner, the skilled artisan would not arrive at the process of the present invention.

If the teachings of the two prior art references were combined, the following process would result: Crude water-soluble hydroxyethyl cellulose containing alkali hydroxide is washed with a mixture of 50-70 vol.% methanol and 50-30 vol.% acetone or isopropanol. The washing fluid is neutralized with an acid and the neutralized washing fluid is subjected to distillation (process as taught by Warzecha). The hydroxyethyl cellulose is subjected to an electrodialysis as taught by Takahashi. However, this is not the process of claims 33 and 50 of the subject patent application.

Because electrodialysis of the non-ionic hydroxyethyl cellulose does not make any technical sense, the skilled artisan might try to combine the two prior art references in a diffent manner: Crude water-soluble carboxymethyl or sulfoethyl sodium salt containing alkali hydroxide is washed with a mixture of 50-70 vol.% methanol and 50-30 vol.% acetone or isopropanol. The washing fluid is neutralized with an acid and the neutralized washing fluid is subjected to distillation (process as taught by Warzecha et al. with starting material taught by Takahashi et al.). The carboxymethyl sodium salt is subjected to an electrodialysis as taught by Takahashi et al. However, this is again not the process as claimed in claims 33 and 50 of the subject patent application.

Applicants have reviewed the prior art made of record and relied upon, but do not find it pertinent to the invention claimed in claims 33-51 of the subject patent application. None of them, either taken separately or in combination, teaches the process of independents claim 33 or 50.

In view of the above discussion and amendments, Applicants assert that the claims are patentable under 35 U.S.C. § 103(a) and 35 USC § 112. Entry of the amendments, favorable reconsideration of the application and allowance of all the claims is solicited.

Respectfully submitted,

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Amended Claims

33. (Currently Amended) In a process for producing polysaccharide ethers comprising:

(i) treating polysaccharide with a basic compound to promote swelling of the polysaccharide;

(ii) reacting the polysaccharide with at least one derivatizing agent in a liquid medium comprising at least one organic solvent under conditions effective to promote a reaction between the polysaccharide and the derivatizing agent and form a reaction product comprising a polysaccharide ether, the basic compound and the organic solvent and a residue of the polysaccharide;

(iii) treating at least a portion of the reaction product comprising the basic compound with an acidic compound to provide a neutralized liquid comprising a salt of the acidic compound and the basic compound; and

(iv) separating the polysaccharide ether from at least one of the reaction product or the neutralized liquid:

The improvement which comprises:

(a) subjecting the neutralized liquid to a first separation at an alkaline pH to separate the salt from the organic solvent and the residue of the polysaccharide and provide a purified, neutralized liquid; and

(b) subjecting the purified, neutralized liquid to an electric current and ~~suitable~~ a separation means effective to promote the conversion of the salt to the acidic compound and the basic compound.

34. (Original) The process of claim 33 which provides an acid product stream comprising the acidic compound.

35. (Original) The process of claim 33 which provides a base product stream comprising the basic compound.

36. (Original) The process of claim 33 further comprising utilizing at least a portion of the acid product stream in step (iii) of claim 1.

37. (Original) The process claim 33 further comprising utilizing at least a portion of the base product stream in step (i) of claim 1.

38 (Original) The process of claim 33 wherein said subjecting of the purified, neutralized liquid with the electric current is conducted in the presence of a bipolar membrane effective to provide a source of hydrogen and hydroxyl ions.

39. (Currently Amended) The process of claim 33 wherein the first separation is conducted by electrodialysis with a semi-permeable membrane.

40. (Original) The process of claim 39 wherein the pH is effective to inhibit the deposition of the residual of the polysaccharide on the membrane.

41. (Original) The process of claim 40 wherein the pH is greater than about 10.

42. (Original) The process of claim 41 wherein the pH is from 10.5 to 14.

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43. (Original) The process of claim 41 wherein the electric current has a current density of from 500 to 2000 amps per square meter.

44. (Original) The process of claim 33 wherein the organic solvent is selected from the group consisting of acetone, ethanol, isopropyl alcohol, t-butyl alcohol, mono-, di, and triethylene glycol and mixtures thereof.

45. (Currently Amended) The process of claim 33 wherein the basisc compound is selected from the group consisting of sodium hydroxide, potassium hydroxide, calcium hydroxide, magnesium hydroxide, lithium hydroxide, ammonium hydroxide and mixtures thereof.

46. (Original) The process of claim 33 wherein the acidic compound is selected from the group consisting of acetic acid, nitric acid, hydrochloric acid, sulfuric acid, phosphoric acid and mixtures thereof.

47. (Original) The process of claim 33 wherein the polysaccharide is selected from the group consisting of cellulose, starch, pectin, chitosan, chitin, agar, carrageenan, alginate, guar, arabic, tragacanth, xanthan gum and mixtures thereof.

48. (Original) The process of claim 33 wherein the derivatizing agent is an alkylene oxide and selected from the group consisting of ethylene oxide, propylene oxide, butylene oxide and mixtures thereof.

49. (Original) The process of claim 33 which further comprises derivatizing the polysaccharide ether with at least one cationic, anionic or hydrophobic substituent.

50 (Currently Amended) A process for producing cellulose ethers comprising:

(i) treating cellulose with a basic compound to promote swelling of the cellulose;

(ii) reacting the cellulose with at least one derivatizing agent in a liquid medium comprising at least one organic solvent under conditions effective to promote a reaction between the cellulose and the derivatizing agent and form a reaction product comprising a cellulose ether, the basic compound and the organic solvent and a residue of the cellulose;

(iii) treating at least a portion of the reaction product comprising the basic compound with an acidic compound to provide a neutralized liquid comprising a salt of the acidic compound and the basic compound; and

(iv) separating the cellulose ether from at least one of the reaction product or neutralized liquid:

The improvement which comprises:

(a) subjecting the neutralized liquid to a first separation by electrodialysis with a semi-permeable membrane at an alkaline pH to separate the salt from the organic solvent and the residue of the cellulose and provide a purified, neutralized liquid; and

(b) subjecting the purified, neutralized liquid to an electric current and ~~suitable~~ a separation means effective to promote the conversion of the salt to the acidic compound and the basic compound.

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51. (Original) The process of claim 50 wherein the pH is effective to inhibit the deposition of the residue of the cellulose on the membrane.